The goal of AAC intervention is to build communicative competence. Allow individuals with CCN to participate fully in all aspects of life:
- Express needs and wants
- Exchange information
- Build social closeness
- Participate in social etiquette routines

Communicative competence is defined as:
- “the state of being functionally adequate in daily communication and of having sufficient knowledge, judgment, and skills to communicate effectively in daily life” (Light, 1989)

The silence of speechlessness is never golden. We all need to communicate and connect with each other – not just in one way, but in as many ways as possible. It is a basic human need, a basic human right. And much more than this, it is a basic human power. (Williams, 2000: p. 248)
Language skills are the foundation of communicative competence.

- Skills in the language(s) spoken by the family and community
  - Receptive
  - Expressive
- Skills in the “language” code of the AAC system(s)
  - Content, form, use

Provide early intervention
- Too often “early” intervention is not early
- 80% of children are > 2 years old when they receive AAC services (Hustad, et al., 2005)
- As a result, these children have no means of communication during critical stages of development
- They fall further and further behind their peers

Don’t wait to provide AAC intervention.
- Research demonstrates that AAC interventions have positive effects on communication, language, literacy, and behavior.
- These benefits come at no risk to speech development.
- Meta-analyses consistently demonstrate that AAC does not impede speech development (Millar, Light & Schlosser, 2006; Schlosser & Wendt, 2008)

Provide early AAC intervention for children at risk from birth.

Focus on motivating and meaningful contexts within the natural environment.
- Numerous opportunities for communication
  - Not just expression of needs and wants
  - But rather opportunities for sustained social interaction
- Involve parents and families as well as daycare/school teams

Provide access to a rich language environment.
- Introduce wide range of concepts
  - Not just object labels, but also questions, social expressions, relational terms
- Provide access to concepts via AAC
  - Do not require children to prove knowledge first
  - Support children in learning language via AAC
- Add vocabulary on a daily basis

Provide opportunities for communication
- Pause and wait
- Model AAC & speech
  - Speech & sign
  - Speech & aided AAC
- Respond to child’s communicative intent
  - Expand & model more complex language
Intervention to build linguistic competence

- Introduce literacy skills early
  - Use literacy to teach language concepts, syntax & morphology
- Intervention to teach literacy skills
  - Direct instruction in basic skills
    - Phonological awareness, letter sound correspondences, single word decoding, sight word recognition
  - Numerous opportunities to apply skills in meaningful & motivating reading activities

Results of intervention to build language/literacy skills

- With early AAC intervention, children with CCN demonstrate
  - Significant increases in their rates of turn taking
  - Significant growth in their expression of concepts
    - AAC provides a powerful visual support to facilitate language learning
- As children with CCN learn literacy skills, they also demonstrate significant gains in language
  - Gains in syntax and morphology

Summary of intervention to build language skills

- Start early
- Focus on meaningful & motivating activities in the natural environment
- Provide access to a rich language environment/effective means to communicate
  - Introduce literacy skills early
- Provide opportunities for communication
  - Pause and wait
- Model AAC & speech
- Respond to child’s communicative intent

The development of communicative competence

- Rests on knowledge, judgment, and skills in four interrelated domains:
  - Linguistic
  - Operational
  - Social
  - Strategic

For further information on literacy intervention, visit http://aacliteracy.psu.edu

Early intervention for young children with autism, cerebral palsy, Down syndrome & other disabilities
Website at http://aackids.psu.edu

Light (2012)
Operational domain

- Skills in the technical production, operation & use of AAC systems
  - Skills to produce hand (or body) shapes, positions, orientations, & movements required for unaided systems
  - Skills to technically operate & use aided AAC systems
    - Low tech & high tech systems

Intervention to maximize operational competence

- In order to maximize operational competence,
  - AAC systems should impose minimal learning demands
- Current AAC technologies reflect the conceptual models of nondisabled adults
  - As a result, many AAC systems are not developmentally appropriate for children
- Need to re-think the design of AAC systems
  - Reduce the learning demands for children

Re-thinking AAC displays

- Why do we design AAC displays for children in the way we typically do?
  - Are we handicapping young children in their language development?

Re-thinking AAC symbols

PCS for “big”
- 0% correct
  - Others thought it was “ants”, “sludge”, “coloring”, “blacktop for basketball”, “chocolate”, “germs”, etc

Child’s representation of “big”
Most of the children drew a person that was big – powerful, capable

PCS for “want”
- Only 4% correct
  - Others thought it was “a TV”, “cut off hands”, “hands and soap”, etc

Child’s representation of “want”

PCS for “who”
- 0% correct
  - Others thought it was “a back of a head”, “a boy eating spaghetti”, “a hair cut”, “a 7 with ears”, etc

Child’s representation of “who”
“Girl says, ‘Mom, who is that?’ ‘This is your new daddy.’”
Children's representations differ significantly from AAC symbols

- Preschoolers represent language in very different ways than traditional AAC symbols
  - Reflect very different underlying conceptualizations/meanings
  - Include depictions of entire scenes or events
  - Embed the concepts in context
  - Include complete objects/people in these scenes
    - Do not include "parts" of objects or people
  - Usually include familiar people, objects & experiences
- Results robust across different cultural groups

Traditional AAC displays

<table>
<thead>
<tr>
<th>TRADITIONAL GRID LAYOUT</th>
<th>GRID FOR &quot;PLAYING TELEPHONE&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each language concept is represented by separate AAC symbols in &quot;boxes&quot; organized in rows &amp; columns</td>
<td></td>
</tr>
<tr>
<td>Language is taken out of context</td>
<td></td>
</tr>
<tr>
<td>Understanding symbols relies on semantic memory</td>
<td></td>
</tr>
<tr>
<td>Each representation must be processed separately, understood, &amp; then integrated</td>
<td></td>
</tr>
</tbody>
</table>

Re-thinking the design of AAC displays for young children

- Are traditional grid displays appropriate for young children with complex communication needs?
- Are there better ways to represent language concepts for young children?
- Are there better ways to organize language in AAC displays for young children?
- How can we reduce the learning demands for young children?

Alternative approach to AAC displays

Visual scene displays

<table>
<thead>
<tr>
<th>VISUAL SCENE DISPLAY (VSD)</th>
<th>VSD FOR “PLAYING TELEPHONE”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocabulary embedded under &quot;hot spots&quot; in integrated visual scene</td>
<td></td>
</tr>
<tr>
<td>Language is presented in meaningful context</td>
<td></td>
</tr>
<tr>
<td>Scene is processed as an integrated unit</td>
<td></td>
</tr>
<tr>
<td>Meaning is derived from the entire scene</td>
<td></td>
</tr>
</tbody>
</table>

Research on layout of AAC displays

- Series of studies to investigate the effects of different layouts
  - Grid displays
  - Visual scene displays
- Investigate performance of children across various developmental stages
  - Infants (9-12 months old)
  - Toddlers (2½ years old)
  - Preschoolers (4 & 5 year olds)

Research on the effect of type of display

- Infant study (Wilkinson & Light, in progress)
  - 4 different contexts familiar to infants
    - Feeding, bathing, playing ball, etc
  - Infants viewed pairs of displays for each context
    - E.g., PCS grid vs. photo VSD
    - Position & order counterbalanced
  - Eye tracking technology
    - Measure visual attention / interest
Type of display affects visual attention of infants

- Infants looked first & longest at photo VSD compared to PCS grid
- Infants at "first words" stage demonstrated strong preference for photo VSDs

Type of display affects performance

- Toddlers were more accurate locating vocabulary using VSDs than grid displays (Drager, Light, et al., 2003)
- It was not until 4 & 5 years of age that children performed with similar accuracy using VSDs or grid displays (Light, et al., 2004)

Implications for designing AAC displays for young children

- Results suggest that VSDs may be better suited than grid displays for:
  - Infants, toddlers, younger preschoolers
  - Other beginning communicators (under age 4 - 5 developmentally)
- Compared to traditional grid displays, VSDs:
  - Attract more visual attention
  - Result in more accurate performance locating vocabulary
  - Seem to support more rapid lexical development / language learning
Potential advantages of VSDs for young children
- VSDs represent familiar events and activities
- Language concepts are presented in context
- VSDs preserve conceptual & visual relationships between people & objects that occur in life
- VSDs provide motivating & interesting contexts
- VSDs also seem to offer visual processing advantages
- Young children’s early language learning experiences are centered on communicative interactions with familiar adults.
- It is therefore important to include these people and events as key component in VSDs.

What are the key components of VSDs?
- Young children’s early language learning experiences are centered on communicative interactions with familiar adults.
- It is therefore important to include these people and events as key component in VSDs.
- Including people in VSDs promotes visual attention and interest
  - People in scenes have a powerful effect on visual attention (Wilkinson & Light, 2011)

People in scenes have a powerful effect on visual attention

VSDs should include people engaged in meaningful activities

Implications for practice
- Minimize operational costs and maximize power of communication by designing developmentally appropriate AAC systems
  - Individuals at the early stages of language development benefit from
    - VSDs that include photos /familiar images of people engaged in meaningful & motivating events
  - At later stages of development, children require access to AAC technologies that
    - Provide access to traditional orthography
    - Support more advanced language & literacy development

Additional resources
- For more information on designing AAC systems for young children with complex communication needs, see the webinar at
- Or visit our AAC at Penn State website for further information
  - [http://aac.psu.edu](http://aac.psu.edu)
Communicative competence depends on
- Knowledge, judgment, and skills in four interrelated domains:
  - Linguistic
  - Operational
  - Social
  - Strategic

Social domain
- Sociolinguistic skills
  - E.g., Discourse skills
    - E.g., turn taking, initiation/ responses
  - Communicative functions
  - Sociorelational skills
    - Knowledge, judgment, and skills in the interpersonal aspects of communication

Sociorelational Skills (Light, Arnold, & Clark, 2003)
- Participating actively in interactions
- Being responsive to partners
- Demonstrating interest in partners
- Putting partners at ease
- Projecting a positive self-image
- Engaging partners in interaction
- Maintaining a positive rapport

Challenges in the Development of Sociorelational Skills
- Individuals with CCN
  - May lack the means to demonstrate sociorelational skills
  - May lack the social experiences required to develop these skills
  - May experience specific deficits in social development
  - May not receive appropriate intervention to teach these skills

Intervention to build sociorelational skills
- Partner-focused questions are a powerful means to build social competence
- PFQs focus on the partner’s interests, activities, feelings, etc.
  - Serve to put the partner at ease
  - Demonstrate interest in partner/ other orientation

Intervention procedures (Light & Binger, 1998; Light, Binger, Agate, & Ramsay, 1999)
- Identify appropriate interaction contexts
- Provide appropriate vocabulary to ask PFQs
- Provide guided practice in PFQs using least to most prompting hierarchy
  - Natural cue
  - Expectant delay
  - Point
  - Model
- Provide opportunities for practice in varied contexts in natural environment to build generalization & maintenance
**Effects of intervention to build sociorelational skills**
- After intervention, participants
  - Demonstrated acquisition of the target skill
  - Asked partner-focused questions
  - Participated in longer & more frequent interactions
  - Were perceived to be more competent communicators
    - By themselves
    - By familiar partners
    - By observers naïve to AAC

**Communication competence depends on**
- Knowledge, judgment, and skills in four interrelated domains:
  - Linguistic
  - Operational
  - Social
  - Strategic

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**Strategic domain**
- Individuals who require AAC will encounter limitations in their development of linguistic, operational, and social skills
- They will require strategies to allow them to bypass these constraints and make the best of what they do know and can do
  - Temporary strategies
  - Long term strategies

**Examples of strategies**
(Mirenda & Bopp, 2003)
- Difficulty understanding the partner
  - Ask partner to slow down or augment input
- Word or phrase not available
  - Ask partner to "guess"; use another mode; paraphrase
- Rate of communication too slow
  - Ask partners to predict; use telegraphic messages
- Partner is uncomfortable
  - Use an introductory message; use humor

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**Intervention to build strategic competence**
- In daily life, individuals with CCN encounter significant challenges at home, at school, at work, and in the community.
- A mentor is someone who acts as a trustworthy resource to turn to when there is a problem.
  - Ideally a mentor is someone who has "been there" and overcome the challenge.
- A mentor is someone who provides "a brain to pick, a shoulder to cry on, and a kick in the pants."

**The AAC Mentor Project**
(Light, McNaughton, Krezman, Williams, et al., 2002)
- Leadership Training (online) for adults who used AAC
  - To develop skills as effective mentors
  - To build leadership capacity
- Mentor Program (via E-mail)
  - To link adolescents and young adults with adults who also used AAC as mentors
  - To support adolescents and young adults who use AAC in solving problems, meeting personal goals, and developing strategic competence
Asha 2012

**AAC Mentor Project: Leadership Mentor Training**

- 31 adults with CP participated
  - 20-48 years old (mean = 32 years old)
  - All had functional literacy skills
- Self-paced online intervention designed
  - To develop positive and effective interpersonal communication skills
  - To develop collaborative problem solving skills
  - To teach strategies to facilitate access to disability-related information and resources

**Intervention to build effective interpersonal communication skills**

<table>
<thead>
<tr>
<th>L</th>
<th>Listen and communicate respect</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Ask questions</td>
</tr>
<tr>
<td>F</td>
<td>Focus on what your partner is saying</td>
</tr>
</tbody>
</table>

**Intervention to build collaborative problem solving skills**

<table>
<thead>
<tr>
<th>D</th>
<th>Describe the specific problem or goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>Outline lots of ways to solve the problem or meet the goal</td>
</tr>
<tr>
<td>I</td>
<td>Identify the consequences of each plan and choose the best plan</td>
</tr>
<tr>
<td>T</td>
<td>Take action</td>
</tr>
<tr>
<td>!</td>
<td>Celebrate success when your partner meets the goal</td>
</tr>
</tbody>
</table>

**Intervention procedures & results**

- Procedures for strategy instruction
  - Demonstrate benefits of strategy use
  - Outline strategy steps
  - Provide models of strategy use
  - Provide practice in strategy use
  - Provide feedback
  - Provide opportunities for generalization
- All participants acquired the target strategies successfully

**AAC Mentor Program**

- Adolescents & young adults who used AAC choose mentors who used AAC to provide
  - Access to role models
  - Encouragement & social support
  - Collaborative problem solving and goal setting
  - Access to relevant resources

**Topics discussed**

- Mentors and adolescents / young adults discussed a wide range of topics
  - Community involvement
  - Education
  - Friendships / relationships
  - AAC and communication
  - Family
  - Independent living / aides
  - Employment
  - Financial issues, etc.
AAC mentor program results

- Goal attainment
  - Protégés set a total of 80 goals with their mentors
    - Attained 32%
    - Made progress toward 51%
    - Did not make progress toward 16%

AAC Mentor Program Satisfaction / Social validation

- 96% of protégés were very satisfied; they liked
  - Talking to someone who understood
  - Sharing experiences
  - Getting new ideas for doing things
  - Being "a part of something"

- 97% of mentors were very satisfied; they liked
  - Helping someone else
  - Sharing similar experiences
  - Meeting someone new

Falling in love, starting a new school, starting a new job, changing communities or homes, mastering a skill, learning a new piece of assistive technology - all are easier and more fun if the experience can be shared with and guided by someone who has "been there"

Michael Williams

Integration of skills across domains

- Communicative competence depends on the integration of knowledge, judgment and skills across linguistic, operational, social and strategic domains
  - Linguistic and operational skills provide the tools for communication
  - Social and strategic skills focus on effective use of these tools in interactions
- Attainment of communicative competence is a complex process that requires concerted intervention

The art and the science of building communicative competence

- Building communicative competence with individuals who require AAC requires both science and art
  - The science
    - Research that advances understanding and practice
  - The art
    - The belief and the commitment to the right of all individuals to express themselves fully and seek their full potential

http://mcn.ed.psu.edu/~mentor/ (Light, McNaughton, Krezman, Williams, et al., 2002)
Special thanks to all who participated in our research. Thank you so much for allowing us to be a part of your lives.

- We are grateful for the funding support that we have received
  - The National Institute on Disability and Rehabilitation Research (grant #H133G80044);
  - The AAC-RERC through NIDRR (grants #H133G8004, #H133E090026, #H133E050013, #H133E090011);
  - The National Institutes of Health (grants #1R43HD059231-01A1, #1D25F995);
  - The U.S. Department of Education (grants #H325K080333, #H325K110315, #H325D110008); and
  - The Hintz Family Endowed Chair in Children’s Communicative Competence.
- The author has no conflict of interest